Private Drinking Water Wells

Approximately 42 million people (US Geological Survey, 1995) in the U.S. obtain water from their own private drinking water supplies. Most of these supplies are drawn from ground water through wells, but some households also use water from streams or cisterns. EPA does not oversee private wells, although some state and local governments do set rules to protect users of these wells. EPA encourages these households to take special precautions to ensure the protection and maintenance of their drinking water supplies.

- EPA has a guide for homeowners entitled **Drinking Water From Household Wells**. This booklet helps answer the most frequently asked questions. It also describes problems to look for and offers maintenance suggestions.
- EPA also offers **Private Wells: Guidance for What to Do After the Flood**.
- **Drinking Water and MTBE : A Guide for Private Well Owners** (http://www.uwex.edu/farmandhome/wqpaap/pdf/mtbe.pdf) is available from Farm*A*Syst and provides basic information and resources about this gasoline additive.

Testing private well water ~ Protecting private well water ~ More information

How can I test the quality of my private drinking water supply?

You should test private water supplies annually for nitrate and coliform bacteria to detect contamination problems early. Test them more frequently and for more potential contaminants, such as radon or pesticides, if you suspect a problem.

If you use a private laboratory to conduct the testing, nitrate and bacteria samples will typically cost between $10 and $20 to complete. Testing for other contaminants will be more expensive. For example, testing for pesticides or organic chemicals may cost from several hundred to several thousand dollars.

Many laboratories are available to test water quality. EPA does not test individual homes, and cannot recommend specific labs to test your drinking water, but states certify water testing labs. You may call your State Certification Officer to get a list of certified water testing labs in your state. Some local health departments also test private water for free. Phone numbers for your local, county, or state health department are available under the "health" or "government" listings in your phone book.

Most laboratories mail back the sample results within days or several weeks. If a contaminant is detected, the results will include the concentration of the contaminant and an indication of whether this concentration exceeds a drinking water quality standard. If a standard is exceeded

in your sample, retest the water supply immediately and contact your public health department for assistance. Some problems can be handled quickly. For example, high bacteria concentrations can sometimes be controlled by disinfecting a well. Filters or other on-site treatment processes may also remove some contaminants. Other problems may require a new source of water, or a new, deeper well. If serious problems persist, you may need to rely on bottled water until a new water source can be obtained.

How can I protect my private water supply?

You can protect your water supply by carefully managing activities near the water source. For households using a domestic well, this includes keeping contaminants away from sinkholes and the well itself. Hazardous chemicals also should be kept out of septic systems.

- Periodically inspect exposed parts of the well for problems such as:

- cracked, corroded, or damaged well casing.
- broken or missing well cap.
- settling and cracking of surface seals.

- Slope the area around the well to drain surface runoff away from the well.

- Install a well cap or sanitary seal to prevent unauthorized use of, or entry into, the well.

- Have the well tested once a year for coliform bacteria, nitrates, and other constituents of concern.

- Keep accurate records of any well maintenance, such as disinfection or sediment removal, that may require the use of chemicals in the well.

- Hire a certified well driller for any new well construction, modification, or abandonment and closure.

- Avoid mixing or using pesticides, fertilizers, herbicides, degreasers, fuels, and other pollutants near the well.

- Do not dispose of wastes in dry wells or in abandoned wells.

- Do not cut off the well casing below the land surface.

- Pump and inspect septic systems as often as recommended by your local health department.

- Never dispose of hazardous materials in a septic system.

More information about private wells

Several sources of technical assistance are available to help you protect your water supply.

The Water Systems Council, a nonprofit organization solely focused on individual wells and other well-based systems, recently opened a hotline for well owners partially funded by a grant from the U.S. EPA. Well owners with questions about wells and well water can call the new hotline at **1-888-395-1033** or visit their website at www.wellcarehotline.org.

The organization Farm*A*Syst/Home*A*Syst provides fact sheets and worksheets to help farmers and rural residents assess pollution risks and develop management plans geared toward their circumstances. For example, Farm*A*Syst helps farmers and ranchers identify pollution risks from nitrates, microbes, and toxic chemicals. Home*A*Syst reaches homeowners who face pollution risks from faulty septic systems, pesticide use, petroleum leaks, and hazardous waste disposal.

Local health departments and agricultural extension agents can also provide general technical assistance. They can be found under the "government" or "health" listings in your phone book. EPA's Safe Drinking Water Hotline also provides access to publications and technical assistance over the phone at (800) 426-4791. Among EPA's publications that may help you is the detailed "Manual of Individual and Non-public Water Supply Systems (EPA 570/9-91-004). Hotline staff may be able to direct you to sources of state and local assistance.

Many states, organizations, and university extension services offer information for private well owners. Some of the many resources available are:

Testing of private wells (Michigan State University)
Information for homeowners with private wells (Wisconsin Dept. of Natural Resources)
Best Management Practices for Wellhead Protection (University of Idaho College of Agriculture)
Protecting your well and water supply (Kentucky Division of Water)
American Ground Water Trust
National Ground Water Association's page for well owners

Consumer Factsheet on: NITRATES/NITRITES

List of Contaminants

As part of the Drinking Water and Health pages, this fact sheet is part of a larger publication:

National Primary Drinking Water Regulations

This is a factsheet about a chemical that may be found in some public or private drinking water supplies. It may cause health problems if found in amounts greater than the health standard set by the United States Environmental Protection Agency (EPA).

What are Nitrates/Nitrites and how are they used?

Nitrates and nitrites are nitrogen-oxygen chemical units which combines with various organic and inorganic compounds. Once taken into the body, nitrates are converted into nitrites. The greatest use of nitrates is as a fertilizer.

Why are Nitrates/Nitrites being regulated?

In 1974, Congress passed the Safe Drinking Water Act. This law requires EPA to determine safe levels of chemicals in drinking water which do or may cause health problems. These non-enforceable levels, based solely on possible health risks and exposure, are called Maximum Contaminant Level Goals.

The MCLG for nitrates has been set at 10 parts per million (ppm), and for nitrites at 1 ppm, because EPA believes this level of protection would not cause any of the potential health problems described below.

Based on this MCLG, EPA has set an enforceable standard called a Maximum Contaminant Level (MCL). MCLs are set as close to the MCLGs as possible, considering the ability of public water systems to detect and remove contaminants using suitable treatment technologies.

The MCL for nitrates has been set at 10 ppm, and for nitrites at 1 ppm, because EPA believes, given present technology and resources, this is the lowest level to which water systems can reasonably be required to remove this contaminant should it occur in drinking water.

These drinking water standards and the regulations for ensuring these standards are met, are called National Primary Drinking Water Regulations. All public water supplies must abide by these regulations.

What are the health effects?

Short-term: Excessive levels of nitrate in drinking water have caused serious illness and sometimes death. The serious illness in infants is due to the conversion of nitrate to nitrite by the body, which can interfere with the oxygen-carrying capacity of the childs blood. This can be an acute condition in which health deteriorates rapidly over a period of days. Symptoms include shortness of breath and blueness of the skin.

Long-term: Nitrates and nitrites have the potential to cause the following effects from a lifetime exposure at levels above the MCL: diuresis, increased starchy deposits and hemorrhaging of the spleen.

How much Nitrates/Nitrites are produced and released to the environment?

Most nitrogenous materials in natural waters tend to be converted to nitrate, so all sources of combined nitrogen, particularly organic nitrogen and ammonia, should be considered as potential nitrate sources. Primary sources of organic nitrates include human sewage and livestock manure, especially from feedlots.

The primary inorganic nitrates which may contaminate drinking water are potassium nitrate and ammonium nitrate both of which are widely used as fertilizers.

According to the Toxics Release Inventory, releases to water and land totaled over 112 million pounds from 1991 through 1993. The largest releases of inorganic nitrates occurred in Georgia and California.

What happens to Nitrates/Nitrites when they are released to the environment?

Since they are very soluble and do not bind to soils, nitrates have a high potential to migrate to ground water. Because they do not evaporate, nitrates/nitrites are likely to remain in water until consumed by plants or other organisms.

How will Nitrates/Nitrites be detected in and removed from my drinking water?

The regulation for nitrates/nitrites became effective in 1992. Between 1993 and 1995, EPA required your water supplier to collect water samples at least once a year and analyze tem to find out if nitrates/nitrites are present above 50 percent of their MCLs. If it is present above this level, the system must continue to monitor this contaminant every 3 months.

If contaminant levels are found to be consistently above their MCLs, your water supplier must take steps to reduce the amount of nitrates/nitrites so that they are consistently below that level. The following treatment methods have been approved by EPA for removing nitrates/nitrites: Ion exchange, Reverse Osmosis, Electrodialysis.

How will I know if Nitrates/Nitrites are in my drinking water?

If the levels of nitrates/nitrites exceed their MCLs, the system must notify the public via newspapers, radio, TV and other means. Additional actions, such as providing alternative drinking water supplies, may be required to prevent serious risks to public health.

Drinking Water Standards (ppm): MCLG MCL

Nitrate:	**10**	**10**
Nitrite:	**1**	**1**

Nitrate and Nitrite Releases to Water and Land: 1991 to 1993 (in pounds)

	Water	**Land**
TOTALS	**59,014,378**	**53,134,805**

Top Fifteen States*		
GA	12,114,253	12,028,585
CA	0	21,840,999
AL	3,463,097	6,014,674
LA	8,778,237	2,250
MO	6,985,890	206,181
MS	6,952,387	0
KS	5,140,000	877,095
VA	5,091,764 0	
NV	0	4,977,482
FL	1,056,560	1,835,736
AR	1,206,610	1,058,294
MD	1,802,219	138,819
IA	1,500,340	132,042
OK	1,436,348	14,199
UT	0	1,045,400

Major Industries*		
Nitrogenous fertilizer	41,584,611	8,607,376
Misc. Ind. inorganics	4,113,312	29,676,919
Misc. Metal ores	0	5,764,976
Misc. Ind. organics	5,091,764	0
Fertilizer mixing	480,000	4,554,916
Explosives	850,921	1,297,590
Paper mills	1,727,061	0
Pulp mills	1,321,500	3,350
Canned foods	0	1,056,794
Phosphate fertilizers	1,000,000	0

- State/Industry totals only include facilities with releases greater than 10,000 lbs.

Learn more about your drinking water!

EPA strongly encourages people to learn more about their drinking water, and to support local efforts to protect and upgrade the supply of safe drinking water. Your water bill or telephone books government listings are a good starting point.

Your local water supplier can give you a list of the chemicals they test for in your water, as well as how your water is treated.

Your state Department of Health/Environment is also a valuable source of information. For help in locating these agencies or for information on drinking water in general, call: EPAs Safe Drinking Water Hotline: (800) 426-4791.

For additional information on the uses and releases of chemicals in your state, contact the: Community Right-to-Know Hotline: (800) 535-0202.

10 Ways You Otter Care About Water

1 - Get Involved

We all need clean water. Each one of us pollutes the water - each one of us can help save it. Our contribution may seem small, but they join with those of thousands of others for a big impact.

2 - Save Water

Saving water will help our streams by reducing the volume of water going through sewage treatment plants and septic systems.

- A dripping faucet wastes 20 gallons of water a day and a leaking toilet 200 gallons.
- If your water meter dial moves when no water is running you have a leak.
- Use water sparingly while brushing your teeth, washing dishes, or shaving.
- Install a water conservation shower head and take short showers instead of baths. A bath uses 30-50 gallons of water, a short shower only 10gallons.

3 - Dispose of Household Products Carefully

Many products under your kitchen sink or in the garage can harm our streams.

- Never pour paints, preservatives, brush cleaners, and solvents down a drain. Sewers or septic tanks do not remove these materials, and they can enter the water untreated.
- Stuff paints cans and other chemical containers with newspaper before discarding. This adsorbs the liquid and reduces migration of the liquid.
- Buy the product with the least amount of toxic materials.
- Used turpentine and brush cleaners can be filtered and reused.

4 - Care for Your Lawn Ecologically

Lawns with trees and shrubs prevent erosion, soak up nutrients before they run off into the water, and improve your soil by adding organic material.

- Mulching your garden and avoiding exposed soil can improve moisture retention as well as prevent soil erosion.
- Use the proper fertilizer, and do not over fertilize. Be sure that lawn services use only the chemicals that your individual yard needs.

5 - Practice Sensible Pest Control

Pesticides can kill ALL Bugs. A better way to eliminate harmful garden bugs is to encourage helpful bugs and animals such as birds.

- Make sure wood piles which attract termites are away from your home.
- Remove old tires from water where mosquitoes like to breed.
- Follow pesticide directions carefully. Do not apply near water or bare ground, or if rain is forecasted.

6 - Dispose of Trash and Garbage Properly

Discarding trash over a stream bank or in a sink hole can cause unsightly problems for our streams. When water flows through trash it can carry with it the chemicals we discard. Open dumps also provide breeding places for bacteria, insects and rodents which can further contaminate our streams.

- Sign up for regular trash collection and encourage your neighborhoods to do the same.
- Take large appliances and other bulky wastes to an approved landfill.

7 - Control Soil Erosion

When rain falls on bare soils in gardens, plowed fields, or building sites, dirt washes into our streams. Not only does it muddy streams, fill in channels, and destroy breeding habitat; but carries with it bacteria and chemicals found in the soil.

- Mulch or plant ground cover on exposed areas.
- Use no-till planting.
- Follow "best management practices" on your building site.

8 - Use Car Care Products Wisely

Motor-oil, anti-freeze and battery acid harm nearby water if they wash off driveways and parking areas.

- Drain uesd fluids into containers, not onto the ground.
- Recycle these products if posible.
- If you cannot recycle these products in your area put them in a strong plastic bag with newspaper or other absorbent material.
- Wash your car on grass so that the water and detergent is filtered through the grass before entering the stream.

9 - Maintain Your Septic System

If a septic system fails, its untreated waste can seep through the ground into our streams. Your system is not working properly if drains and toilets drain slowly or if effluent seeps upward from the ground.

- Use your garbage disposal sparingly to reduce grease and solids in your septic system.
- Don't use your toilet as a garbage can.
- Know the location of your system and keep heavy equipment off the drainage area.
- Plant trees and shrubs away from the drain tiles so they do not clog the drain lines.
- If a public sewersystem is available in your area be sure your home is connected.
- Check with the local Health Department for information on proper management.

10 - Contain Chemical Spills Quickly

If pesticides, oil or similar products leak or spill onto your garage floor or other hard surfaces,quick action is needed to prevent contamination of nearby waterways.

- Do not wash down the area. This will cause further contamination and may carry the material to storm drains or other water sources.
- Surround the contaminated area with dirt or sprinkle sawdust, kitty litter, or other absorbent materials over the spill.
- Put the material in a strong plastic bag and dispose of properly.

Kentucky Division of Water

WATER WATCH groups, administered through this branch. Citizen groups adopt streams, lakes, rivers, and wetlands that they monitor to help keep them clean and usable.

Division of Water
Regional Offices

Bowling Green
1508 Western Avenue
Bowling Green, KY 42104
(270) 746-7475

Columbia
102 Burkesville Street
Columbia, KY 42728
(270) 384-4734

Florence
8020 Ewing Blvd., Suite 110
Florence, KY 41042
(606) 292-6411

Frankfort
643 Teton Trail, Suite B
Frankfort, KY 40601
(502) 564-3358

Hazard
233 Birch Street, Suite 1
Hazard, KY 41701
(606) 435-6022

London
85 State Police Road
London, KY 40741
(606) 676-0157

Louisville
9116 Leesgate Road
Louisville, KY 40222-5084
(502) 425-4671

Madisonville
Madisonville State Office Building
625 Hospital Drive
Madisonville, KY 42431-1683
(270) 824-7529

Morehead
200 Christy Creek Road, Suite 2
Morehead, KY 40351
(606) 784-6635

Paducah
4500 Clarks River Road
Paducah, KY 42003
(270) 898-8468

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KENTUCKY DIVISION OF WATER

14 Reilly Road
Frankfort, Kentucky 40601
(502) 564-3410
http://water.nr.state.ky.us/dow/dwhome.htm

Natural Resources
and
Environmental Protection
Cabinet

Mission Statement

The mission of the Kentucky Division of Water is to manage, protect, and enhance the water resources of the Commonwealth for present and future generations through voluntary, regulatory, and educational programs.

Goals

The division's goals are to

- Oversee the provision of safe drinking water
- Prevent water pollution
- Manage water resources

within a

- Workplace environment that encourages and rewards professionalism

using a

- Systematic process for evaluating effectiveness and efficiency.

Responsibilities

The Division of Water is charged with the responsibility for managing and protecting the state's waters, both on the surface in lakes, streams, and rivers as well as groundwater beneath the surface of the land in the state.

The division is divided into nine branches to carry out its responsibilities.

Branches of the Division of Water and their responsibilities are:

Kentucky Pollutant Discharge Elimination System (KPDES) Branch - Issues permits to control the amount of pollutants that can be discharged to the surface waters of the commonwealth.

Facilities Construction Branch - Reviews plans for building or altering wastewater treatment plants and sewage collection systems.

Drinking Water Branch - Reviews design and operation plans for drinking water plants and monitors their operation.

Water Resources Branch - Issues permits for construction in floodplains to help prevent losses from flooding; inspects dams listed in the state's inventory; and aids communities in drawing up water supply plans and issues water withdrawal permits.

Water Quality Branch - Develops water quality standards and criteria; collects and analyzes physicochemical and biological data for rivers, streams, lakes, and wetlands throughout the state and prepares summaries and reports of this information; and develops and implements nonpoint source pollution control programs for surface and ground waters, including assessment, on-site evaluation, education, and agency coordination activities.

The *Wild Rivers Program*, administered by the Water Quality Branch, monitors water quality, enforces land-use compliance, educates users and landowners, and evaluates candidates for future designation.

Groundwater Branch - Oversees the Wellhead Protection Program, Groundwater Protection Plans, and trains and certifies water well drillers.

Field Operations Branch - Inspects water and wastewater treatment plants to monitor their operations and assure the safety of the public's drinking water and the state's streams; provides technical assistance; responds to complaints from citizens; and responds to environmental emergencies and natural disasters involving land, air, or water.

Enforcement Branch - enforces water quality and drinking water laws and regulations; trains and certifies wastewater and drinking water plant operators and offers technical assistance to plants through its *CompTrain* program.

Program Planning and Administration Branch - Citizens across the state can get involved in protecting the state's waters by joining one of the division's internationally acclaimed

- √ Application of chloride-based deicing materials used on roads or parking lots;
- √ Emergency response activities;
- √ Fire fighting activities;
- √ Transportation of materials by car, truck, train, boat, or plane;
- √ Application of fertilizers or pesticides on farm lands.

Generic groundwater protection plans may govern all or part of a person's activities. A generic plan prepared by another person or group, including a trade group, may be used if:

- The activities identified are substantially identical.
- The factors identified do not cause substantial differences in the potential to pollute among locations.
- The groundwater protection plan has been reviewed and approved by the cabinet.

The cabinet, in cooperation with other appropriate state agencies, shall prepare generic groundwater protection plans for use of **existing residential septic systems** and **construction, operation, closure, and capping of water wells.**

Examples of entities that will require plans

- churches, schools, businesses, etc., with on-site sewage systems
- small businesses with chemical storage areas
- hazardous waste generators
- city or county governments
- lawn care services
- service stations

The Division of Water will begin inspecting groundwater protection plans after the Aug. 24, 1995, deadline.

Commonly asked questions:

Q. Are there forms for submittal to the Cabinet?

A. Site-specific plans are not required to be submitted to the Cabinet. However, plans must be retained on site, and the Cabinet or citizens may request to review them.

Q. If I have a spill prevention control and countermeasure plan or stormwater plan, do I need to develop a groundwater protection plan?

A. Yes.

Q. How long must records be kept?

A. Records must be kept for six years.

Q. When do I do another plan?

A. Plans must be amended prior to implementing new activities and must be recertified every three years.

For additional information, contact:
Groundwater Branch
Kentucky Division of Water
14 Reilly Road
Frankfort, Ky. 40601
(502) 564-3410

Natural Resources and
Environmental Protection Cabinet

Groundwater . . .
Protecting it is now the law

A guide to Kentucky's new groundwater regulation

What are requirements?

What activities are affected?

Goals:

√ Ensure protection for all current and future uses of groundwater
√ Prevent groundwater pollution

Requirements:

√ For the activities listed, prepare a groundwater protection plan (as required under 401 KAR 5:037)

Activities that are affected:

√ Pesticide storage and handling for commercial purposes or distribution to a retail sales outlet
√ Pesticide application for commercial purposes, public right-of-way maintenance, or institutional lawn care
√ Land treatment or land disposal of a pollutant
√ Storage, treatment, disposal, or handling of hazardous waste, solid waste, or special waste in landfills, incinerators, surface impoundments, tanks, drums, or other containers or in piles
√ Commercial or industrial storing or related handling in bulk quantities of raw materials, intermediate substances or products, finished products, substances held for recycling, or other pollutants held in tanks, drums, or other containers or in piles
√ Transmission in pipelines of raw materials, intermediate substances or products, finished products, or other pollutants
√ Installation or operation of on-site sewage disposal systems
√ Storing or related handling of road oils, dust suppressants, or deicing agents at a central location
√ Application or related handling of road oils, dust suppressants, or deicing materials
√ Mining and associated activities
√ Installation, construction, operation, or abandonment of wells, bore holes, or core holes
√ Collection or disposal of pollutants in an industrial or commercial facility through the use of floor drains that are not connected to on-site sewage disposal systems, closed-loop collection or recovery systems, or a waste treatment system permitted under the Kentucky Pollutant Discharge Elimination System
√ Impoundment or containment of pollutants in surface impoundments, lagoons, pits, or ditches
√ Commercial or industrial transfer, including loading and unloading, in bulk quantities of raw materials, intermediate substances or products, finished products, substances held for recycling, or other pollutants.

If any of the above activities are permitted under other state or federal programs, the individual conducting the activities is <u>not</u> exempt from the requirement to develop a groundwater protection plan.

Activities that are exempt:

Groundwater protection plans are not required if it can be demonstrated by substantial evidence that the activity has no reasonable potential of altering the physical, thermal, chemical, biological, or radioactive properties of groundwater in a manner, condition, or quantity that will be detrimental to the public health or welfare, to animal or aquatic life, to the use of groundwater as present or future sources of public water supply, or the use of groundwater for recreational, commercial, industrial, agricultural, or other legitimate purposes. Such a demonstration should consider at least:

√ Hydrogeologic sensitivity at or near the location of the activity;
√ Quantity of the pollutants, including the cumulative potential to pollute from small discharges, spills, or releases that individually would not have the potential to pollute;
√ Physical, chemical, and biological characteristics of the pollutants such as solubility, mobility, toxicity, concentration, and persistence;
√ Use of the pollutants at the locations of the activities;
√ Present and potential uses of the groundwater.

Specific exclusions:

The regulation does not apply to the following activities:

√ Normal use or consumption of products sized and packaged for personal use;
√ Retail marketing of products sized and packaged for personal use;
√ Activities conducted entirely inside enclosed buildings if:
  - The building has a floor sufficient to prevent the release of pollutants to groundwater; and
  - There are no floor drains, or all floor drains within the building are connected to an on-site sewage disposal system, closed-loop collection or recovery system or a waste treatment system permitted under the Kentucky Pollutant Discharge Elimination System;
√ Storing, related handling, or transmission in pipelines of pollutants that are gases at standard temperature and pressure;
√ Storing municipal solid waste in a container located on property where the waste is generated and where it is held prior to off-site disposal;
√ Installing and operating sewer lines or water lines approved by the cabinet;
√ Storing water in ponds, lakes, or reservoirs;
√ Impounding stormwater, silt, or sediment in surface impoundments;